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of the port should remain free and not subject to the customs duties of the Empire. This has been a favorable factor, for it permits quick loading, unloading and reshipping of goods. Like most North German ports, Hamburg was located inland at the junction of river and ocean navigation. For modern commerce, connection with the ocean has been accomplished at a cost, in fifty-six years, of $12,000,000, by dredging a channel seaward to accommodate the largest ships at high tide and ordinary ships at low tide. The Elbe is so narrow that harbors have been excavated on either side until in 1909 there were 1,575 acres of harbor surface and a total water front of forty-one miles. Around these are quays, railroad tracks and modern facilities for handling freight.

The Elbe, extending its navigable course into Bohemia, constitutes "an extension of the lighterage service of Hamburg." Not only is the river kept navigable, but the principal towns have built harbors and efficient devices for handling freight. Moreover, the Elbe is connected by canals with the rivers of eastern Germany. The Prussian railroads do not cooperate favorably with the Elbe traffic, but the railroads of Saxony and Austria follow the opposite policy, so that the Austrian exports at Hamburg exceed those at Trieste. By favorable rates much export freight is attracted to Hamburg from the west German industrial region, freight that would otherwise pass down the Rhine. The interesting story of the Hamburg-American Line, its rise, development and connection with the home port is told in considerable detail.

The eight chapters treat of (1) the development of the hinterland; (2) the channel to the sea; (3) port facilities; (4) oversea lines; (5) shipbuilders and merchants; (6) waterways and railways; (7) shipping and commerce in 1907; (8) Hamburg's commerce with its hinterland, 1907. Maps and illustrations that illustrate add to the value of the book.

The book is timely and suggestive when so much is being said about the development of American waterways. The readable style and abundance of well chosen facts make it welcome to the teacher of geography, either in secondary school or college.

F. V. EMERSON.

PHYSICAL GEOGRAPHY

Charts of the Atmosphere for Aeronauts and Aviators. By A. Lawrence Rotch and Andrew H. Palmer. 1st edition. 96 pp. of text. John Wiley & Sons, New York, 1911. $2. 9 x 11½.

It was one of the striking characteristics of the meteorological work which was so effectively done by the late Professor A. Lawrence Rotch that emphasis was always laid upon the practical application of the results. Thus, immediately after the founding of the Blue Hill Observatory, in 1885, the issue of local weather forecasts was begun. The splendid series of observations of cloud heights, velocities, directions of movement and methods of formation led to important conclusions regarding the use of clouds as weather prognostics; and the pioneer investigations which were carried on at Blue Hill, and elsewhere, by means of kites and balloons, naturally led Professor Rotch to emphasize the practical application of the results for the use of airmen. Thus, in the valuable set of "Charts of the Atmosphere for Aeronauts and Aviators," published about a year before his untimely death, Professor Rotch, with the collaboration of Mr. A. H. Palmer, of the Blue Hill staff, published, in simple and useful form, with clear, concise descriptive text, the results of the exploration of the free air carried on by Blue Hill Observatory, and on the Atlantic Ocean, the latter in cooperation with M. Teisserenc de Bort. These charts, which are the first of their kind, furnish a valuable and interesting summary of the splendid work done by Professor Rotch, which will always stand as one of the most important American contributions to meteorology.

Most of the twenty-four charts are concerned with wind velocities and wind pressures at different altitudes at Blue Hill. The first and the last charts will, however, doubtless have the most general "popular" interest. The former gives a vertical cross-section of the atmosphere up to a height of seven miles, and shows the greatest heights to which man has climbed or ascended in the free air; the average height of the different kinds of clouds measured at Blue Hill; the atmospheric densities at different altitudes, and the average heights in the free air at different latitudes of the temperatures of freezing, 0° Fahr., and 30° below zero. The last chart of the set shows the best aerial routes to be followed by aviators across the North Atlantic Ocean in summer.

No one can study these excellent charts without feeling very deeply the loss which meteorology has sustained in the recent death of Professor Rotch. He truly was a pioneer in a new science. R. DEC. WARD.

Our Weather. By J. S. Fowler and William Marriott. xi and 131 pp. Maps, ills., index. E. P. Dutton & Co., New York, 1912. 35 cents. 6 x 4.

This is one of the best of the numerous small texts on meteorology which we have seen. It gives, within the compass of 131 pages, a clear, readable and accurate account of the more common meteorological phenomena and observations, with sufficient explanation for the beginner. There are only two or three things which we wish were differently stated. The deflection of the wind from the gradient is still explained in the incomplete way first suggested by Hadley. And, "when rain is frozen, hail is formed," is somewhat inaccurate, even for a very simple primer. On the whole, however, we are much pleased with the little book. It is well illustrated, pleasantly written, and covers the subject in a remarkably successful way. The authors have skilfully avoided going too far into details, and have had space enough to include mention of some human relations of the weather, weather and agriculture, and weather lore. It is worth while to note that of the ten cases at Greenwich since 1841 when the temperature has exceeded 94°, three occurred during the memorable summer of 1911 (p. 30). R. DEC. WARD.

ECONOMIC GEOGRAPHY

Les Chemins de Fer Coloniaux Français. Par R. Godfernaux. 439 pp. Maps, ills. H. Dunod & E. Pinat, Paris, 1911. 12½ x 9.

This is a handy reference work on railroads built in the French colonies. The author deals mainly with technical methods in vogue among French engineers practicing outside the boundaries of their country. The information given on the resources of the different colonies is of a very general nature and devoid of the interest which will be found in the short accounts of their economic development.

A historical sketch of the exigencies that have led to the building of the several lines precedes their study. This is followed by an account of the construction replete with tales of financial and technical difficulties. All these notes contain data of value to engineers desirous of acquiring information regarding technical practice in districts situated at remote distances from centers of civilization. Great thoroughness appears to have prevailed in the collection of figures on costs and revenues of operation. Equal care has been bestowed on the technical description of the line and the rolling stock in use. While this is not of immediate import to the geographer, the description of the districts lying on either side of the various right-of-ways are not lacking in geographical interest when coupled to a study of these same districts as affected by the lines constructed.

Some forty railroad maps scattered through the text serve to illustrate the gradual penetration of the network of steel tracks in the heart of regions but recently considered as inaccessible. Unfortunately, no scale is given on some of these maps, the incentive to consult them being thereby weakened. Barring this error of omission, their usefulness as regards the location of these oversea French railroads is not questionable. LEON DOMINIAN.

The Railway Conquest of the World. By Frederick A. Talbot. xv and 334 pp. Ills., index. J. B. Lippincott Co., Philadelphia, 1911. $1.50. 8½ x 5½.

No better measure of the physiographic aspects of the earth can be found than in the efforts of mankind to subdue them; and the railroads which have penetrated nearly every type of earth structure and climatic condition are